AMENDMENTS TO THE SPECIFICATION

Please insert or replace paragraphs as follows.

Cross-Reference to Related Applications (newly added)

This application is a divisional application of application serial number 10/193,497, filed 11 July 2002, which in turn is a divisional application of application serial number 08/414,865, filed 31 March 1995, now U.S. Patent No. 6,510,031, issued 21 January 2003.

Paragraph bridging pages 4-5

In accordance with the present invention, an apparatus for sensing a magnetic field by the giant magnetoresistive effect (GMR) is described comprising a plurality of magnetic stripes spaced apart on the upper surface of a substrate such that the stray fields at the ends of the magnetic stripes provide a magnetostatic coupling which magnetizes the magnetic stripes in alternating directions in a zero magnetic field, a nonmagnetic conductive material such as copper, positioned in the spaces between the magnetic stripes to form a conductive path between respective stripes, and terminals or electrodes for introducing current along the conductive path for detecting the change in resistance through the plurality of stripes and conductive paths as a function of magnetic fields applied to the magnetic stripes. The magnetic stripes may be rectangular in shape and spaced apart from one another by at least 100Å to prevent any exchange coupling. The magnetic stripes may comprise a soft magnetic material. The ~~electrostatic~~ <u>magnetostatic</u> coupling between ends of magnetic stripes may be enhanced by positioning transverse magnetic stripes over or abutted to the ends which function as permeable "keepers". The cross-sectional areas of the magnetic stripes may be less than 1000Å square. The apparatus is suitable for incorporation in a head for sensing a magnetic disk in a magnetic disk operating

system. When the magnetic stripes are magnetized in alternating directions, a high resistance state is measured to current passing through the plurality of magnetic stripes and when a magnetic field causes the magnetic stripes adjacent one another to be magnetized in the same direction, a low resistance state is measured to current passing through the plurality of magnetic stripes.

Page 7, second paragraph

Figure 2 is a second perspective view diagram of ~~a second~~ <u>the first</u> embodiment of the invention.

Page 9, first full paragraph

Magnetic stripes 12 through 15 may be made of soft magnetic material such as iron, nickel or alloys thereof having high permeability, low coercive force and small hysteresis loss so that anisotropy fields are small and do not dominate the saturation field of the respective magnetic stripe. The ends of magnetic stripes 12 through 15 are positioned with respect to one another to foster magnetic coupling between respective ends of magnetic stripes resulting in odd or even magnetic stripes 12 through 15 being magnetized in opposite directions to respective even or odd magnetic stripes as shown in Fig. 2. For example, magnetic stripes 12 and 14 are magnetized in a first direction shown by arrows 36 and 37 which are parallel and correspond the longitudinal ~~axis~~ <u>axes</u> 38 and 39 respectively. Magnetic stripes 13 and 15 are magnetized in a second direction opposite to the first direction shown by arrows 42 and 43 which are parallel to the longitudinal ~~axis~~ <u>axes</u> 44 and 45 respectively.

Paragraph bridging pages 13-14

As media 32 moves domain wall 79 past magnetic stripes 12-15, the magnetic stripes will be magnetized in the down direction near domain wall 79 ~~as shown by arrows 77 in Figure 1~~. As media ~~32,~~ <u>32 moves</u> domain wall ~~79, moves~~ 79 way past magnetic stripes 12-15, the

fringing magnetic fields of domain 72 will be parallel to surface 33 and there will be no vertical or transverse magnetic component to magnetize magnetic stripes 12-15. Magnetic head 10 will be in the high resistance state.

Page 14, first full paragraph

Figure 3 shows an alternate embodiment of the invention where in addition to the plurality of magnetic stripes 12 through 15 and nonmagnetic conducting stripes 16 through 19 <u>on substrate 22'</u>, there are magnetic keepers 82 and 83 positioned over the ends of the magnetic stripes 12 through 15 as shown in Fig. 3. In Figure 3 like references are used for functions corresponding to the apparatus of Figures 1 and 2. Keepers 82 and 83 function to strengthen or reinforce the magnetostatic coupling connecting the ends of the stripes 12 through 15.

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For optimal performance, a nonmagnetic electrically insulating spacer 84 must separate magnetoresistive stripes 12-15, together with the intervening nonmagnetic conductors 16-19, from the two keepers 82 and 83. Spacer 84 serves to (1) prevent exchange stiffness coupling which would tend to align the stripe magnetizations in the same direction, thus counteracting the beneficial keeper effect, and (2) prevent the keepers, if conducting, from short circuiting magnetoresistive stripes 12-15. Spacer 84 thickness may be in the range from about 50Å to about 200Å and is optimally about ~~100 Å~~ <u>100Å</u> in thickness and needs no lithography since it can blanket over magnetic stripes 12-15 and nonmagnetic conductive stripes 16-19.

Page 15, second full paragraph

Magnetic stripe 15 has flux paths 88 and 89 passing through it in opposite directions as ~~a flux path~~ <u>flux paths</u> 88 and 87 in magnetic stripe 14. Flux path 89 also passes through magnetic stripe 20.

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Figure 7 shows a top view of magnetic device 136 for sensing a magnetic field. Device 136 consists of a substrate 137 having a magnetic layer 138 formed thereover. Magnetic layer 138 has nonmagnetic regions 140 therein which may be formed by diffusing germanium or silicon into nickel, cobalt or alloys thereof which destroys the magnetic moment therein. Magnetic layer 138 is ferromagnetic. Arrows 143 through 146 show a flux path formed around nonmagnetic region 147. As is illustrated in Figure 7, the flux path is completely contained within the magnetic layer 138 without penetrating into the nonmagnetic region 147. The magnetic flux around nonmagnetic region 148 is shown by arrows 149 through 152. Similarly, the magnetic flux around the nonmagnetic region 148 is also completely contained within the magnetic layer 138 without penetrating into the nonmagnetic region 148. Nonmagnetic regions may be sub-lithographic in dimension for example presently less than 350 nm. Nonmagnetic region 140 may be produced by bombarding a nickel-cobalt alloy layer having a film of germanium thereover with 100 KV Ge ions.

Page 20, second full paragraph

Referring to Fig. ~~7~~ 8, one method for making a magnetic head will be described. A blanket coating of nickel, iron or cobalt or combinations thereof are deposited on an insulating substrate. The magnetic stripes are defined by lift-off or subtractive lithography. Electron beam or x-ray lithography will be required to obtain spacing between magnetic stripes, of the order of 100Å. The magnetic stripes are then overcoated with a high sputtering yield nonmagnetic metal, for example, copper. The structure is then planarized by sputter etching or removing nonmagnetic metal on top of the magnetic stripes. The sputter etching can be done for example with glancing angle ion beam sputtering.